University Projects : Developing Students into Experienced Professionals.

My Background:

- BS Aerospace Engineering, CU Boulder, 1993. Mechanical team lead of a Shuttle Small Payload.
- MS Aerospace Engineering, ASU, 1996. Co-founder and project manager of ASUSat 1.
- JPL System Engineer (Section 313), 1996-2000. Delivered several flight instruments.
- Currently the Mars Exploration Rovers Payload Project Element Manager (Section 387), and a PhD Student at USC.

University Hands-on Projects provide students with the following:

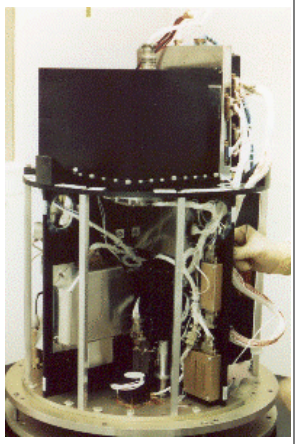
- The opportunity to apply their textbook training to real-world applications.
- An introduction to real-world design trades and decision processes.
- An end-to-end example of project phases including concept, design, build, test & operations.
- An exposure to real-world problems including project communications, documentation, design pitfalls, workmanship errors, and others.
- Exposure to Space Environment issues related to materials and testing.
- An opportunity to actually work on space flight hardware with their own hands.
- Many more benefits.

University Hands-on Projects provide NASA & Industry with the following:

- Trained students with experience in a real space program.
- A fresh look and new solutions to many engineering problems.
- Ideas on streamlined organization and new practices and procedures for small aerospace engineering projects.
- Possible space platforms for testing and providing flight heritage of new technologies.

- All of the above can be accomplished for a significantly low cost.

The following pages provide some comments on my experiences with University Projects in cooperation with Government and Industry.



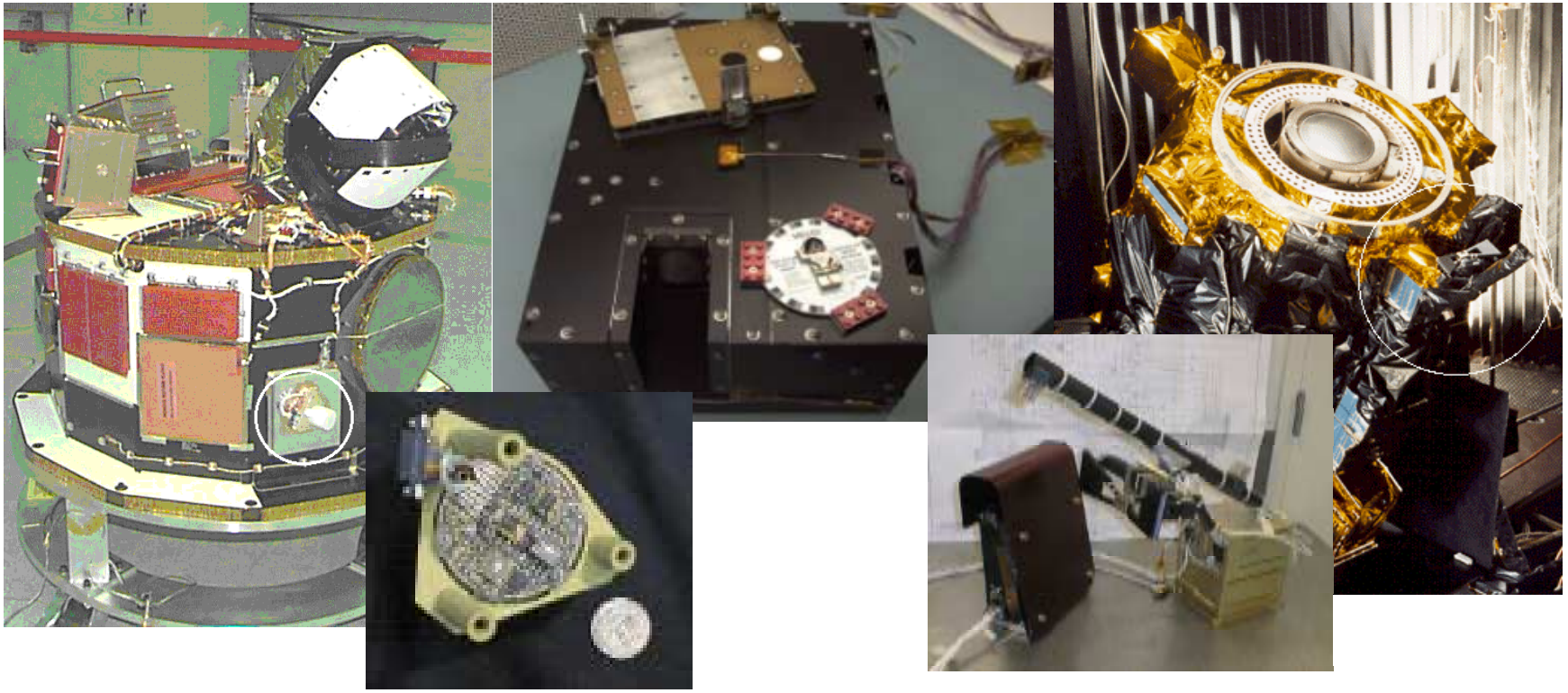
SUVE, STS-56

- University of Colorado, Boulder 1989-1993.
  Get Away Special Payload- Solar Ultra-Violet Experiment (SUVE)
  - Experiment : 1/4m Spectrograph, 1/8m Spectrometer, Pentax Camera w/ H-Lyman-alpha filter, all for EUV measurements of Sun.
  - NASA Space Grant Intern, Mechanical Team Leader.
  - Launched: April 8, 1993.
- **First exposure to an aerospace project, to the subsystems involved, to applying FEA to a real structure, to submitting CAD drawings for machining, to science instrument requirements, and to the processes and complexities of launching space hardware.**
- Hundreds of students have had similar experiences with CU Space Grant Projects.
- Colorado Space Grant Program, CU - Elaine Hansen.

ASUSat 1

- Arizona State University, Tempe 1993-1996.
  - Co-founded ASUSat 1; Program Manager and System Engineer for 3 years.
  - Launched: January 26, 2000.
- **First exposure to project organizational aspects including team-building, schedule and resource planning, configuration management, and more.**
- **The goal of building a 10 pound satellite required innovative approaches and unique solutions to design problems.**
- Hundreds of students have had similar experiences with ASU Space Grant Projects.
- Arizona Space Grant Program, ASU - Dr. Helen Reed.

- JPL Senior System Engineer (Section 313) of the Mars Environmental Compatibility Assessment Instrument, the Plasma Wave Antenna on DS-1, the APS Imager instrument on STRV-2, and several mission and instrument proposals.
- **Many JPL Project experiences have been similar to University Project experiences.**
- **Experiences at CU and ASU prepared me well for JPL.**

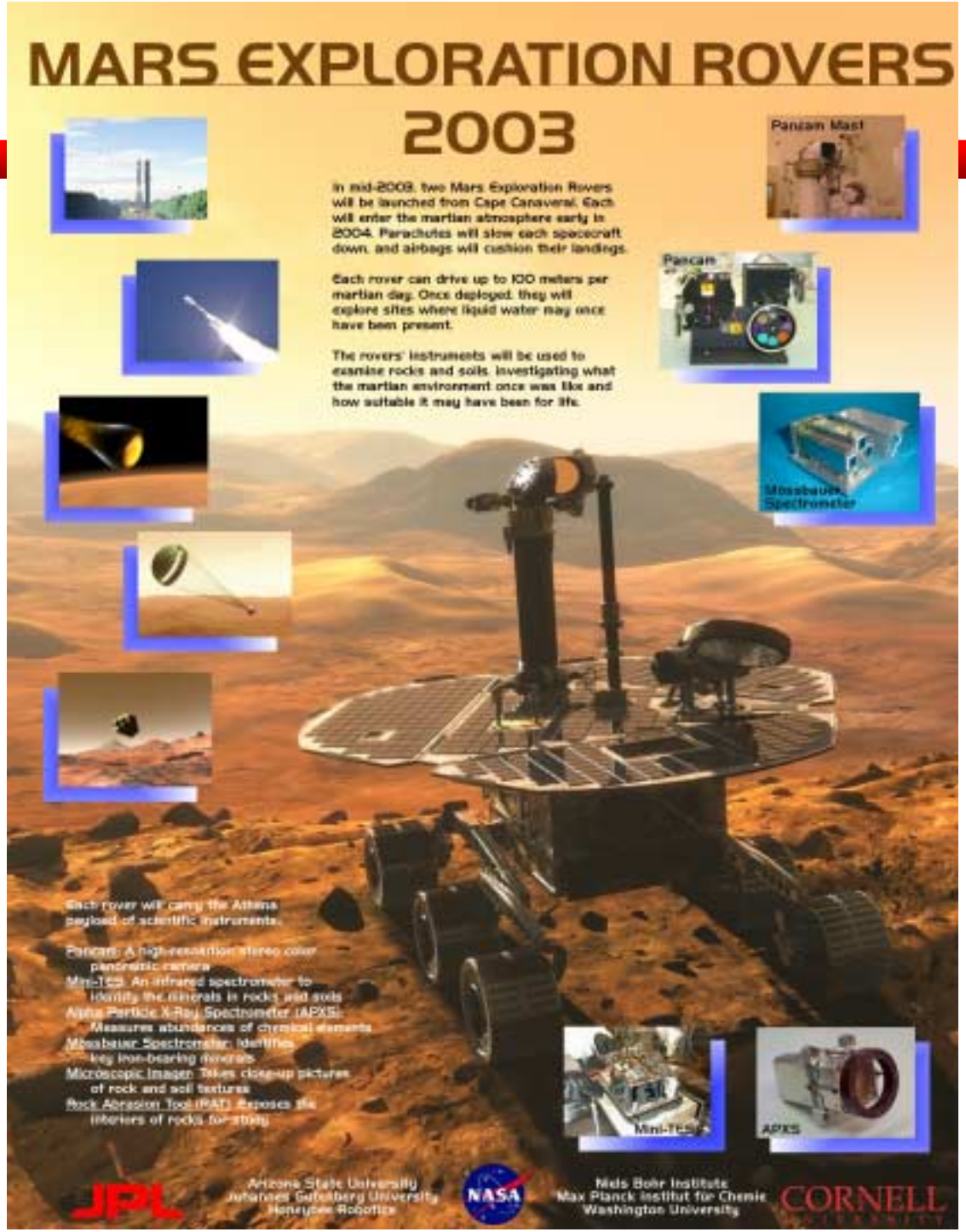


Workforce Development & University-Government Partnerships

- **Currently the Mars Exploration Rovers Payload Project Element Manager (Section 387),**

and a PhD Student at USC

(Research Area: Modeling Flight Instrument Conceptual Design Using Intelligent Agents).



Disclaimer: This page lists my personal opinions of what could be done to make University-Government & University-Industry Partnerships even better. These opinions are my own and do not necessarily reflect the views or opinions of JPL, Caltech, or NASA.

- Space Access:
  - Coordinate secondary payload launch opportunities across multiple launch platforms.
  - Develop additional secondary payload launch capabilities on future launch vehicles.
  - Continue to support and promote existing capabilities (Shuttle, Delta 2, OSP, and Others). (Ref: Worldwide Secondary Payload Launch Capabilities Report, Rademacher, 1999.)
- University Satellites as NASA & Industry Technology Platforms.
  - Award a Launch and ~$2M to a competitively selected University or University Consortium each year for a microsat technology platform.
  - The University could provide a small spacecraft platform for selected NASA and Industry small instruments or small technology demonstrators.
  - It would provide flight qualification for many technologies such as MEMs, micro-gyros, micro-propulsion, APS imagers, and many others.
- University technology demonstration payloads on large missions.
  - Carve out a small volume and other resources on future NMP, Mars, and other large NASA missions.
  - Make the resources available to a University student experiment/technology demo.
- Many other possibilities.